California Water Plan Update 2013

Groundwater Content Enhancement

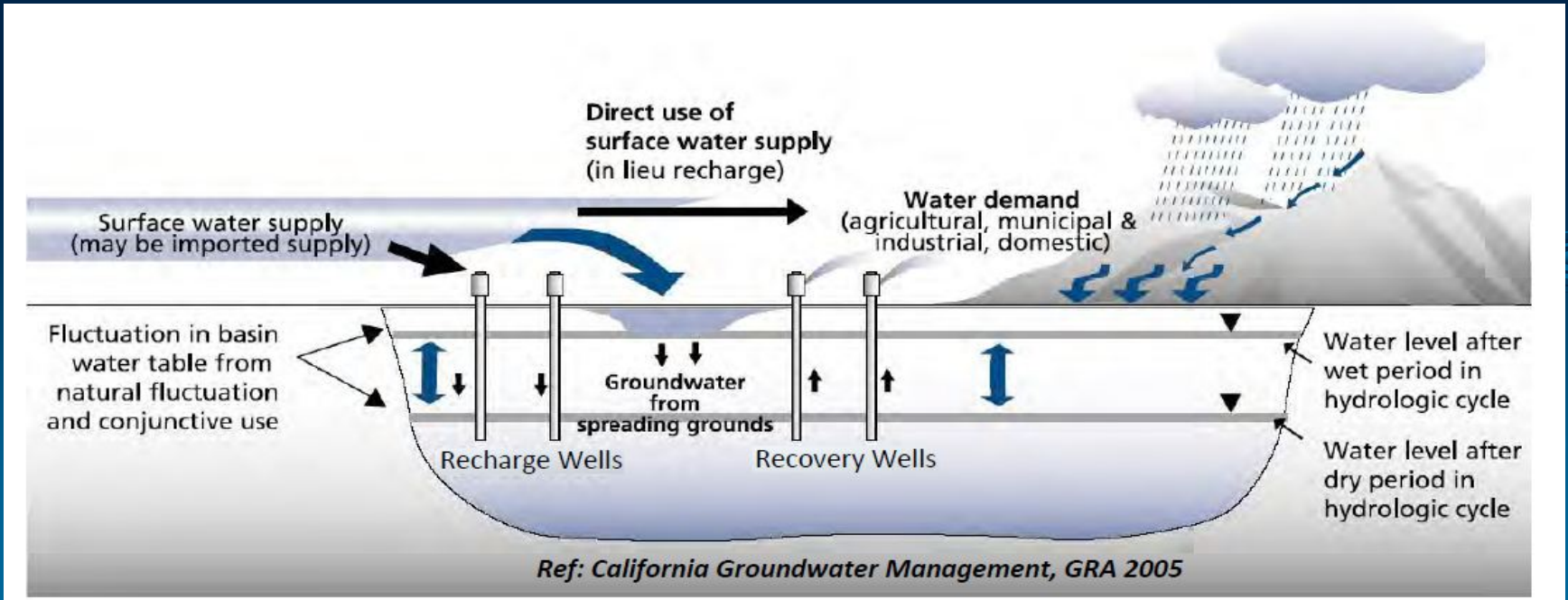
Status of Deliverable #6:
Conjunctive Management and Groundwater Storage

Water Plan Plenary
September 12, 2012



Deliverable #6: Conjunctive Management and Groundwater Storage

Conjunctive Management: The coordinated and planned use and management of both surface water and groundwater resources to maximize the availability and reliability of water supplies.



Deliverable #6: Conjunctive Management and Groundwater Storage

Three Main Goals:

1. Inventory existing conjunctive use, recharge and groundwater banking projects
2. Determine future conjunctive management potential
3. Define program constraints

Deliverable #6: Conjunctive Management and Groundwater Storage

ACWA Online Survey Questions

1. Location of project (groundwater basin level information)
2. Year project developed
3. Capital costs to develop project
4. Annual operating costs (O&M)
5. Administrator/Operator of the project
6. Capacity of the project in acre-feet

Deliverable #6: Conjunctive Management and Groundwater Storage

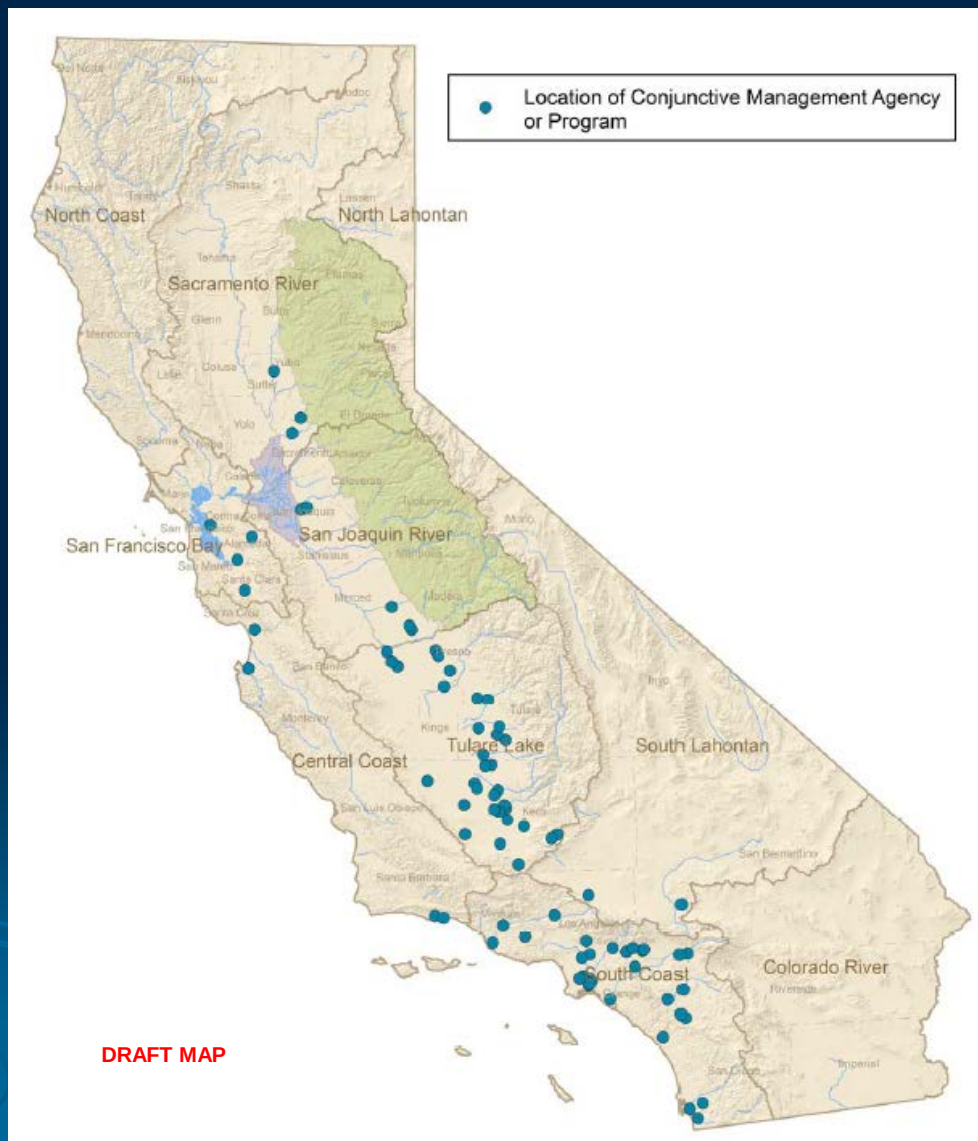
DWR Supplemental Survey Questions

1. Water received
   - SWP, CVP, recycled water, local surface water, other
2. Put and take capacity of the groundwater storage project
   - Annual and cumulative put and take, dry year take
3. Type of groundwater recharge method
   - Direct percolation, in-lieu, ASR, other
4. Program goals and objectives
   - Overdraft, salinity intrusion, water quality, climate change
5. Constraints on development of conjunctive management program
   - Political, legal, institutional, limited aquifer space, water quality, cost, other

Inventory of Conjunctive Management Programs in California

Hydrologic Region	# Active Conjunctive Management Programs
North Coast	0
San Francisco Bay	4
Central Coast	5
South Coast	32
Sacramento River	3
San Joaquin River	5
Tulare Lake	37
North Lahontan	0
South Lahontan	2
Colorado River	1
TOTAL PROGRAMS	89

Note: List may not be complete



Conjunctive Management Programs in Tulare Lake Hydrologic Region

1. Chowchilla Water District
2. Buena Vista Water Storage District
3. Semitropic Water District
4. Arvin-Edison Water Storage District
5. Kern Water Bank Authority
6. Fresno Irrigation District (Waldron Pond)
7. North Kern Water Storage District
8. City of Bakersfield 2800 Acre Water Bank
9. Meyers Water Bank and Wildlife Project
10. Delano-Earlimart Irrigation District
11. City of Fresno
12. Consolidated Irrigation District
13. Kings County Water District
14. James Irrigation District
15. Kern County Water Agency
16. Kern-Tulare/Rag Gulch Water District
17. Rosedale-Rio Bravo Water Storage District
18. Cawelo Water District
19. Golden Hills Community Service District
20. Kern Delta Water District
21. Laton Community Service District
22. Liberty Water District
23. Terra Bella, Lower Tule River, Saucelito, Poxley and Porterville Irrigation Districts
24. Tranquility Water District
25. Wheeler Ridge-Maricopa Water Storage District
26. Buena Vista Water Storage District and West Kern Water District
27. Shafter Wasco Irrigation District
28. Southern San Joaquin Municipal Utilities District
29. Kern County Water Agency, ID #4
30. Kern County Water Agency and Berrenda Mesa Water District
31. Kern Co Water Agency Pioneer Recharge and Recovery Project
32. James Irrigation District
33. Berrenda Mesa Water District
34. Kaweah Delta Water Conservation District
35. Tehachapi-Cummings County Water District
36. Tejon-Castaic Water District
37. West Kern Water District

Note: List may not be complete

Conjunctive Management Programs in South Coast Hydrologic Region

1. Calleguas Municipal Water District
2. Camp Pendleton
3. Chino Basin Watermaster
4. Compton Water Department
5. Elsinore Valley Municipal Water District
6. Foothill Municipal Water District
7. Inland Empire Utilities Agency
8. Inland Empire Utilities Agency; Three Valleys MWD; Chino Basin Watermaster
9. La Verne, City of
10. Long Beach Water Department
11. Long Beach Water Department and City of Lakewood
12. Los Angeles County Department of Public Works
13. Main San Gabriel Basin Watermaster
14. Metropolitan Water District
15. Orange County Water District
16. Cucamonga Valley Water District
17. Eastern Municipal Water District
18. Raymond Basin Management Board
19. San Bernardino Valley MWD
20. San Bernardino Valley Water Conservation District
21. San Diego, City of, Public Utilities Department
22. Three Valleys Municipal Water District
23. Water Replenishment District of Southern California
24. Helix Water District (El Monte Valley)
25. Oxnard, City of
26. Rancho California Water District
27. Sweetwater Authority
28. United Water Conservation District
29. Upper Los Angeles River Area Watermaster
30. West Basin Municipal Water District
31. Western Municipal Water District
32. Castaic Lake Water Agency

Note: List may not be complete

Conjunctive Management Programs in Other Hydrologic Regions

Central Coast Hydrologic Region

1. Monterey Peninsula Water Management District
2. Monterey Regional Water Pollution Control Agency
3. Pajaro Valley Water Management Agency
4. Goleta Water District
5. Santa Barbara, City of, Water Resources Division

Colorado River Hydrologic Region

1. Coachella Valley Water District

South Lahontan Hydrologic Region

1. Antelope Valley-East Kern Water Authority
2. Mojave Water Agency

San Francisco Bay Hydrologic Region

1. Zone 7 Water Agency
2. Santa Clara Valley Water District
3. Alameda County Water District
4. East Bay Municipal Utilities District

San Joaquin River Hydrologic Region

1. Stockton East Water District
2. Northeastern San Joaquin County Groundwater Banking Authority
3. Madera Ranch Water Bank
4. Madera Irrigation District
5. Root Creek Water District

Sacramento River Hydrologic Region

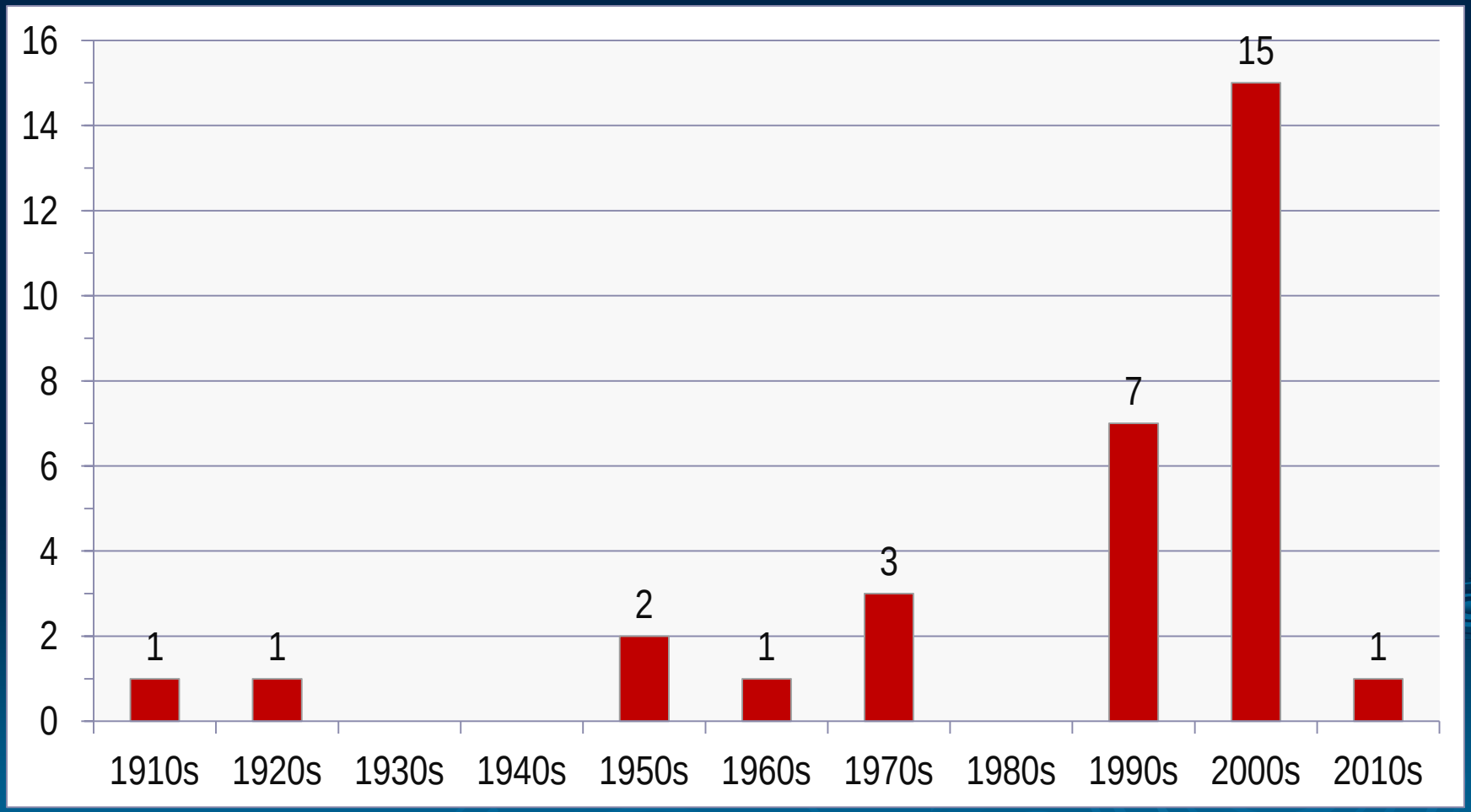
1. Sacramento Suburban Water District
2. Yuba County Water Agency
3. City of Roseville

Note: List may not be complete

Summary of Conjunctive Management Survey Responses

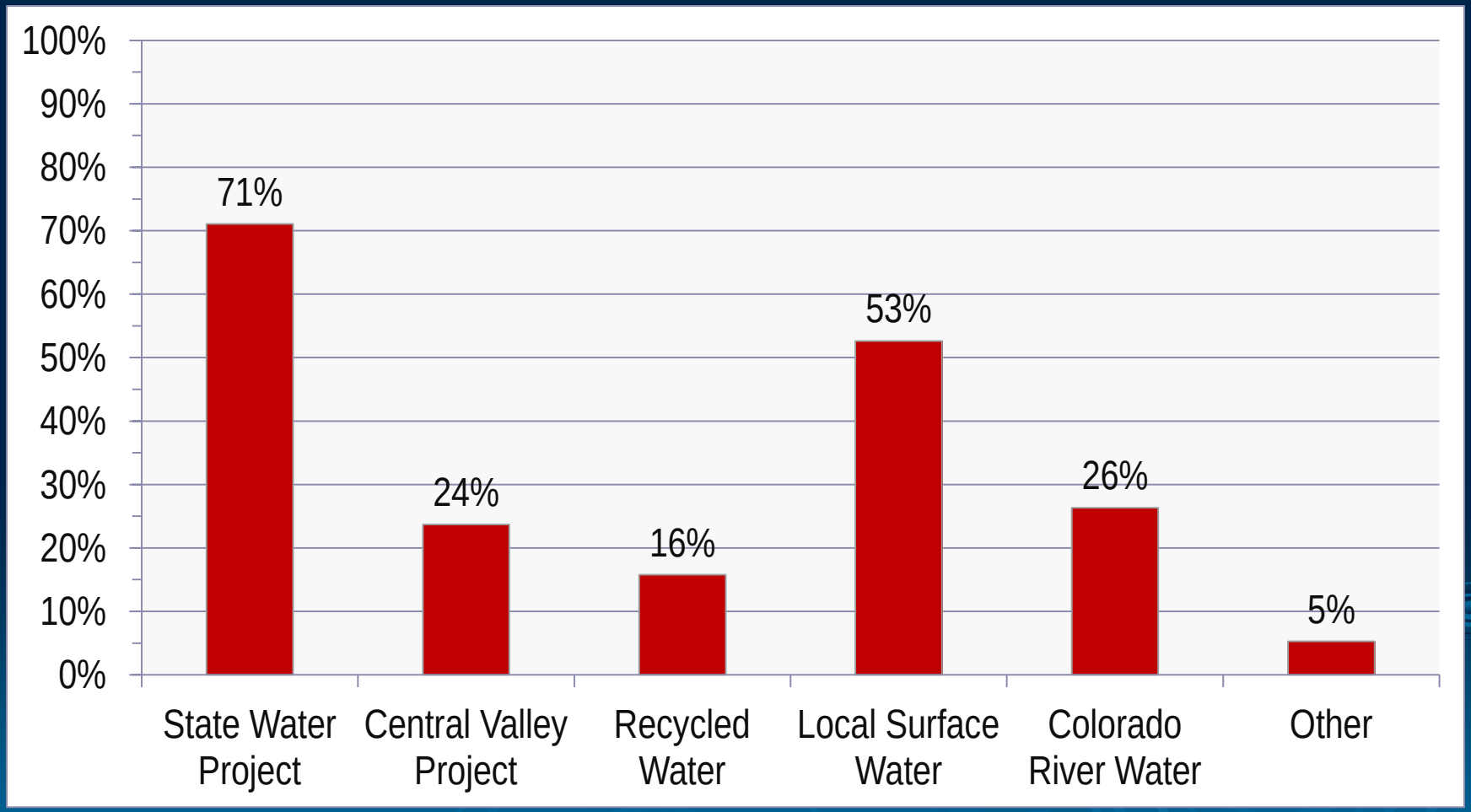
Survey Question Topic	# of Conjunctive Management Survey Responses per Hydrologic Region										
	North Coast	San Francisco Bay	Central Coast	South Coast	Sacramento River	San Joaquin River	Tulare Lake	North Lahontan	South Lahontan	Colorado River	TOTAL
TOTAL PROGRAMS	0	4	5	32	3	5	37	0	2	1	89
Location	--	4	1	24	3	2	3	--	1	1	39
Year Developed	--	4	1	18	3	1	2	--	1	1	31
Capital Cost	--	0	1	12	1	0	2	--	0	0	16
Annual Cost	--	2	1	12	0	0	2	--	1	1	19
Administrator	--	4	1	18	3	3	6	--	1	1	37
Project Capacity	--	4	1	16	3	2	6	--	1	1	34
Source Water Received	--	2	2	19	3	1	9	--	1	1	38
Put/Take Capacity	--	2	2	16	2	4	18	--	1	1	46
Recharge Method	--	3	2	19	3	5	18	--	1	1	52
Goals/ Objectives	--	0	2	18	2	2	11	--	1	1	37
Constraints	--	0	0	13	1	1	8	--	1	1	25

Statewide: Number of Conjunctive Management Projects Developed per Decade



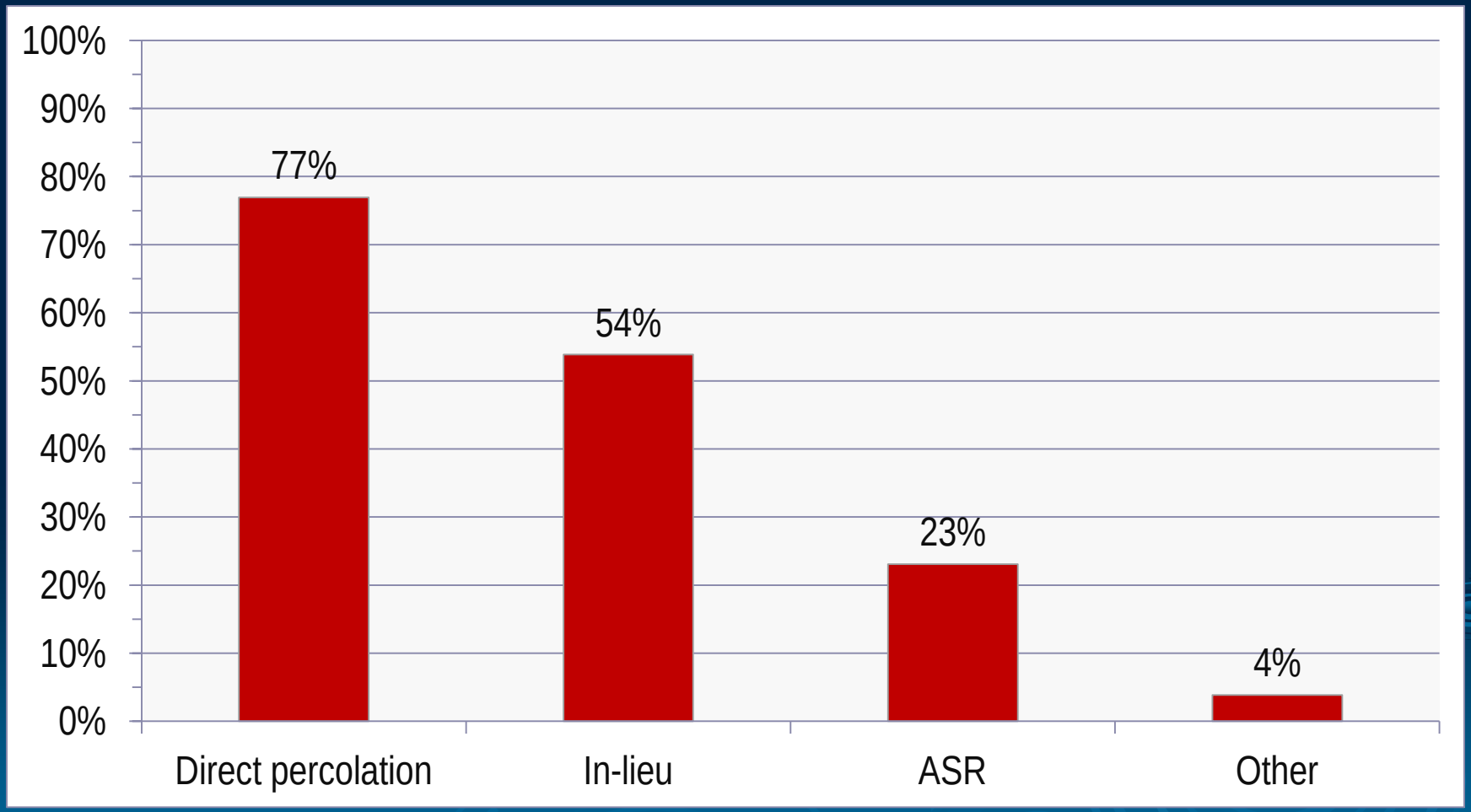
Note: 31 out of 89 programs reporting data

Statewide: Source of Recharge Water



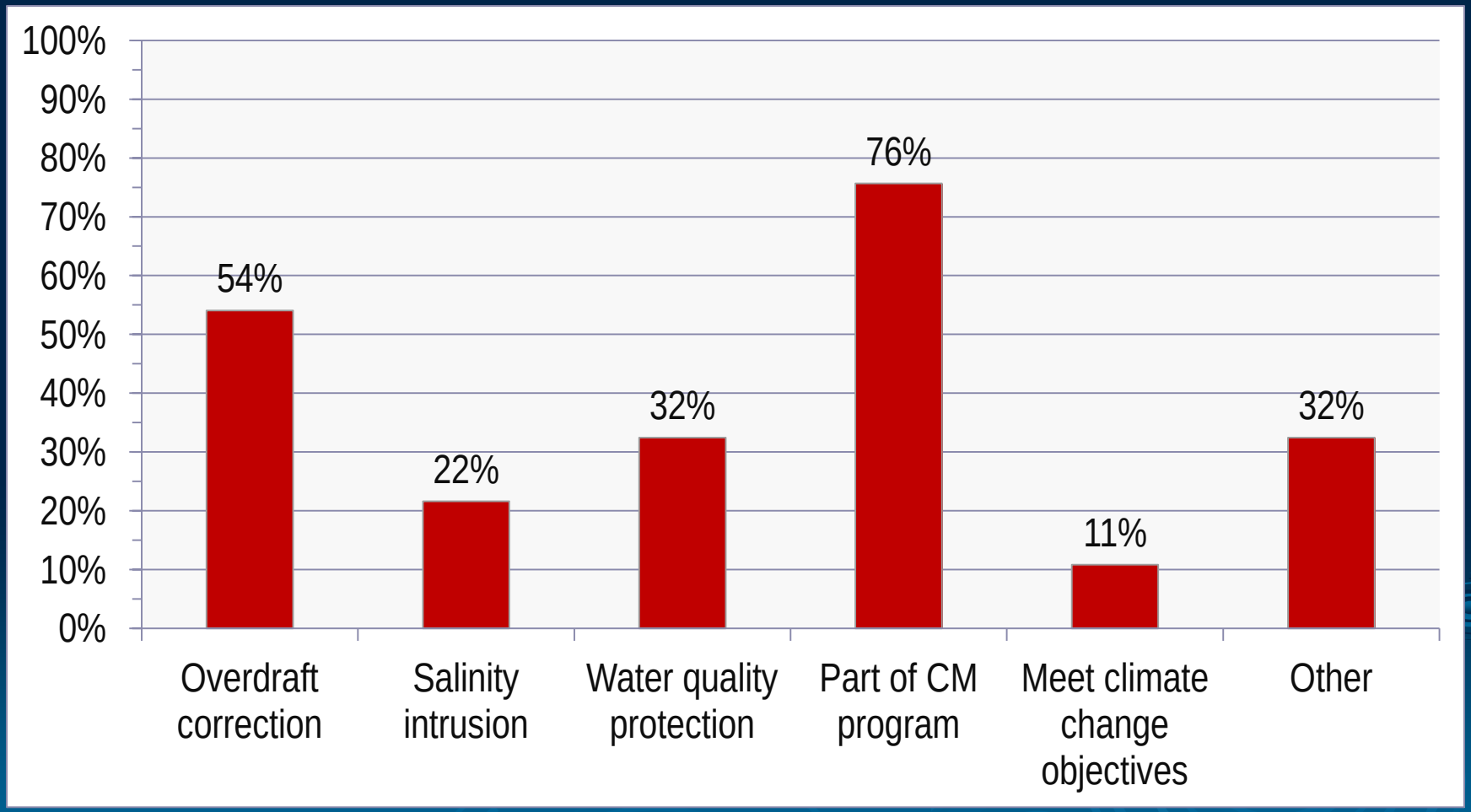
Note: 38 out of 89 programs reporting data

Statewide: Method of Groundwater Recharge



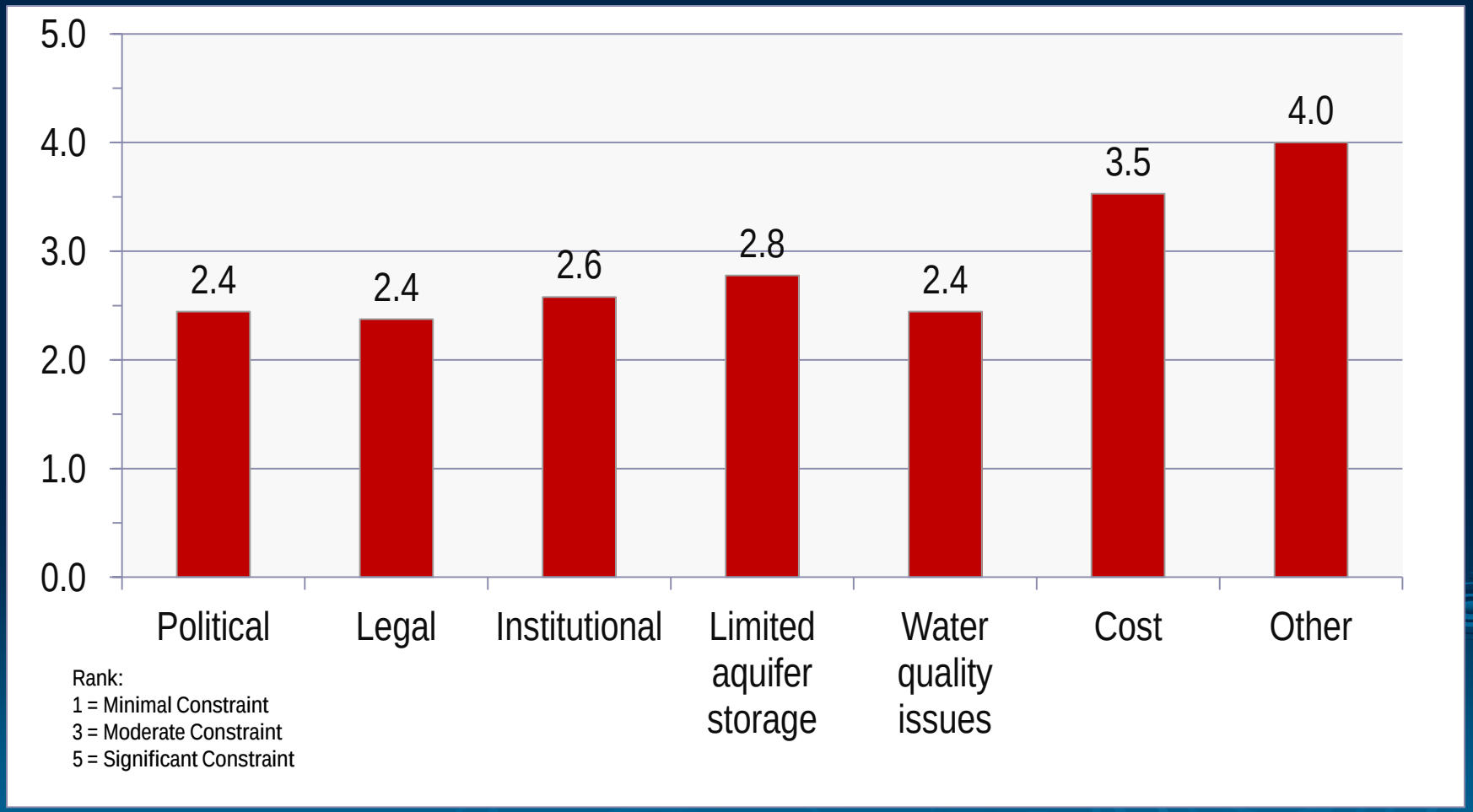
Note: 52 out of 89 programs reporting data

Statewide: Program Goals and Objectives



Note: 37 out of 89 programs reporting data

Statewide: Program Constraints



Note: 25 out of 89 programs reporting data

Conjunctive Management Survey Questions/Responses NOT Graphed

1. Capital Costs to Develop the Project
   - 16 of 89 (18%) reported data
2. Annual Operating Costs
   - 19 of 89 (21%) reported data
   - Variable units: $$ per year vs. $$ per acre-foot
3. Capacity of the Project
   - 34 of 89 (38%) reported data
   - Incomplete responses per hydrologic region
   - Actual vs. Estimated capacities
4. Put and Take Capacity
   - 46 of 89 (52%) reported data
   - Incomplete or variable responses per agency/program

Deliverable #6: Conjunctive Management and Groundwater Storage

Goal 2: Determine Future Conjunctive Management Potential

- Identify/map/describe
  - Available aquifer storage space (Task 4)
  - Map potential recharge areas – AB 359
  - Sources of available water
  - Identify areas of need
- Groundwater Recharge Potential as a Result of Flooding
  - DWR System Reoperation Program (SRP) Phase 1 – Plan of Study
    - SBx2-1 (2008) mandated planning and feasibility studies to identify options for optimizing….groundwater storage capacity

Deliverable #6: Conjunctive Management and Groundwater Storage

Goal 3: Define Constraints

- Limitations on Conjunctive Management
  - Water rights issues
  - Beneficial use of water for recharge
  - Water quality
  - Limiting shallow water table
  - Land use
  - Inconsistent and uncertain regulatory status
  - Lack of data and tools
  - Aquifer storage and conveyance capacity limitations

Deliverable #6: Conjunctive Management and Groundwater Storage

Consistency with CWP Update 2009 Recommendations

- Continue funding studies that increase the coordinated use of surface water and groundwater
- Develop a statewide data management system for conjunctive management projects
- Improve coordination and cooperation among state agencies with groundwater responsibilities
- Better alignment of state and local agencies for groundwater management
- Manage the use of aquifer storage space for managed recharge
- Better coordinate groundwater recharge and flood control activities

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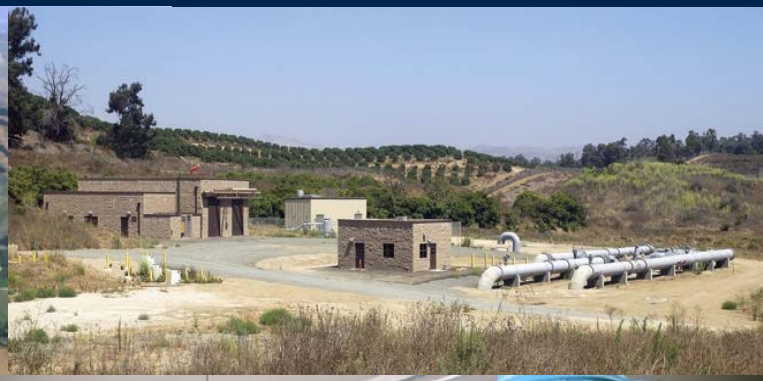
Questions and Comments?



Source: www.unitedwater.org, www.calleguas.com, www.roseville.ca.us